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December 18, 1997

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, DC 20554

Re: Addendum to Response of Telemundo Group, Inc. Filed in Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service Proceeding MM Docket No. 87-268

Dear Ms. Salas:

On behalf of Telemundo Group, Inc. ("Telemundo"), please find enclosed an original and nine copies of a complete version of Exhibit 2 to the Response that was submitted by Telemundo to the Commission yesterday in response to the *Public Notice, FCC Seeks Comments on Filings Addressing Digital TV Allotments*, MM Docket No. 87-268, which was released on December 2, 1997.

Please associate this submission with Telemundo's filing on December 17, 1997, in the above-referenced proceeding. Please file stamp and return the additional copy of this submission. Please call the undersigned with questions.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

By: _____
F. William LeBeau

Attorneys for Telemundo Group, Inc.

Enclosures

No. of Copies rec'd 0+9

TV Station KVEA • Channels N52/D39 • Corona, California

Statement of Robert D. Weller, Consulting Engineer

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of the licensee of TV Station KVEA, Channels N52/D39, Corona, California, to analyze the proposal of the Association of Local Television Stations, Inc. concerning the use of tilt-beam antennas to improve coverage of DTV stations without increasing interference to other stations.

Background

On November 25, 1997, the Association of Local Television Stations, Inc. ("ALTV") submitted to the FCC a proposal to permit DTV stations to increase power, provided tilt-beam antennas and/or other technologies are employed to prevent any incremental visible interference. The Commission in its December 2, 1997, Public Notice, requested comments concerning the ALTV proposal as part of its proceeding in Mass Media Docket 87-268.

TV Station KVEA is licensed to serve the community of Corona, California, from atop Mt. Wilson using NTSC facilities on Channel 52. In Appendix B of the Sixth Report & Order to Mass Media Docket 87-268 ("6th R&O"), the Commission allotted Channel 39 for the associated DTV facilities of Station KVEA-DT. The allotment of Channel 39 for KVEA-DT would be co-channel to TV Station KNSD, San Diego, and there are numerous locations having line-of-sight to both stations, so interference to potential viewers of KNSD is predicted.

Section 73.623(c)(2) of the revised FCC Rules references Appendix B of the 6th R&O and OET Bulletin No. 69 as providing the procedure used to evaluate proposed modifications to allotted DTV facilities. Hammett & Edison obtained, directly from FCC OET, a copy of the computer software program used to generate the DTV allotment table. Once that software was operating properly and generating data consistent with that found in Appendix B, Table 1, presenting DTV allotment pairings with analog NTSC stations, the program was modified to serve as an analysis tool to study allotted DTV facility interference profiles and the effect of potential facility changes. A two-page description of that program accompanies this statement as Figure 1. That program predicts interference to about 25,000 potential viewers of KNSD from KVEA-DT.

Determination of Grade B and Replication Contours Ignored FCC Rules

In developing a protected coverage area for allotted DTV facilities, the Commission used the horizontal-plane antenna patterns contained in its engineering database. Use of these patterns can in many instances lead to incorrect projection of the Grade B contour, which may penalize the

station being analyzed, since the horizontal-plane antenna pattern is usually different from the main-beam antenna pattern. Figure 2 shows the azimuth pattern contained in the FCC's engineering database for KNSD, as well as the calculated horizontal-plane pattern. The two are significantly different because the KNSD antenna operates with mechanical beam tilt. This fact causes the projected coverage of KNSD (and hence the interference from KVEA-DT) to be calculated incorrectly, due in large part to the Commission's failure to account for the actual elevation pattern of the KNSD antenna, including the use of mechanical beam tilt.

Use of Assumed Antenna Elevation Patterns Yields Erroneous Results

In computing the coverage and interference of stations for purposes of channel allotment and coverage replication, the Commission used two UHF standard antenna elevation patterns: one for analog (NTSC) stations and one for DTV stations, as shown in Table 8 of OET Bulletin No. 69. These assumed patterns may be significantly at variance from the actual patterns used, again often resulting in incorrect coverage and interference projections. As examples, Figure 3 shows the assumed and typical* elevation patterns for Stations KNSD(TV) and KVEA-DT.

Use of Actual Elevation Patterns and Proper Treatment of Tilt-Beam Antennas Can Permit Increased Power Operation with No Increase in Interference

Since the computer software used by the FCC does not permit the use of arbitrary antenna elevation patterns or arbitrary electrical or mechanical beam tilts, Hammett & Edison proprietary software, based upon the Terrain Integrated Rough-Earth Model (TIREM), was used to examine the effect of these factors on the calculated interference from KVEA-DT to KNSD. Since the TIREM propagation model yields different results from the FCC's use of Longley-Rice with its consideration of out-of-range errors (Error Marker 3) as having interference-service, it is necessary for comparison to normalize the TIREM results.

A baseline case was calculated using TIREM and the elevation-plane patterns assumed by the FCC software and the azimuth-plane patterns contained in the FCC engineering database. The power level assumed for KVEA-DT was the value of 60.8 kilowatts assigned by the Commission. The resulting calculated interference for this baseline case was normalized to a value of 1. Since the Commission does not require that a particular elevation-plane pattern be used in actual practice, the TIREM calculation was then repeated using the actual antenna patterns contained in the respective construction permit applications on file with the Commission, including the use of

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* Only the electrical beam tilt is shown. As discussed in the text, the elevation-plane pattern form KVEA-DT was assumed to be identical to that used by KVEA.

both electrical and mechanical beam tilts. (As the Commission has done, it was assumed that KVEA-DT will utilize an antenna having radiation characteristics identical to the existing KVEA antenna). The population calculated to experience interference increased by 1.64 times. This result indicates that, by using the assumed elevation-plane patterns and the erroneous data in its engineering database, the Commission's calculation method underestimates the amount of interference caused by KVEA-DT to KNSD by 1.64 times. Nonetheless, this result is the increase in interference that would be expected were KVEA-DT built as authorized.

To determine whether an antenna having elevation-plane characteristics different from the existing KVEA antenna would permit KVEA-DT to operate with greater ERP while not increasing the amount of "authorized interference" to KNSD, the TIREM calculation was again repeated using a uniform electrical beam tilt of 3°. The calculated interference to KNSD decreased to a value of 1.51. The ERP of KVEA-DT was then increased incrementally until the calculated interference again approached 1.64. With an antenna having 3° of electrical beam tilt, the amount of ERP that caused the same amount of interference to KNSD as the existing KVEA antenna at its allotted ERP was about 400 kW – almost seven times the ERP allotted KVEA-DT by the Commission.

Use of Actual Elevation Patterns and Proper Treatment of Tilt-Beam Antennas Can Result in Improved Coverage and Parity with Higher-Power Allotments

Obviously, increased ERP provides for increased signal strength, and therefore greater margin above threshold of visibility; hence greater and more reliable coverage may result by the use of tilt-beam antennas having greater ERP in the main beam. In the instant case, the allotted 60.8 kW facilities of KVEA-DT would provide lesser coverage and would therefore be at a competitive disadvantage with the higher-power assignments in the Los Angeles market. For instance, TV Station KNBC, Channel 4, was assigned DTV Channel 36 at an ERP of 680.9 kW.

At the applicable F(50,90) coverage threshold of 41.1 dBu for KVEA-DT on Channel 39, the population coverage is calculated to be about 13.0 million persons. When an estimating margin of 40 dB is added (for an effective signal level of 81.1 dBu), to provide time-variability in excess of 90%, to account for building penetration losses, to account for viewers in urban areas using non-directional back-of-set antennas, and other factors, the population coverage of KVEA-DT is calculated to be about 397,000 persons. While the applicable 40.8 dBu threshold coverage of KNBC-DT on nearby Channel 36 is similar to that of KVEA-DT at 13.5 million persons, the number of potential viewers having a margin of 40 dB or more is much greater, at 11.1 million persons.

This coverage discrepancy can be partially overcome by permitting the proposed power increase in conjunction with judicious selection of an appropriate antenna elevation pattern that minimizes interference while maximizing coverage. For the above example (KVEA-DT at 400 kW with the specified antenna having 3° of electrical beam tilt), the number of potential viewers having a margin of 40 dB or more improves dramatically to 11.0 million persons – giving KVEA-DT comparable coverage with KNBC-DT.

Summary

A limited study was performed to determine whether the use of tilt-beam antennas would permit greater ERPs for DTV stations without increasing interference to other stations. It was found that provided the actual elevation patterns of the antennas involved (including the actual mechanical and electrical tilts) are used, the ERP of the station studied may be increased by a factor of almost seven times without increasing interference to another station. This finding is specific to the two stations studied. The increased ERP and more focused antenna elevation pattern also provides a dramatic improvement in coverage.

List of Figures

In carrying out these engineering studies, the following attached figures were prepared under my direct supervision:

1. TVIXSTUDY™: Implementation of FCC's interference-based allocation algorithm
2. Comparison of antenna azimuth pattern from FCC engineering database and actual pattern for TV Station KNSD
3. Comparison of FCC-assumed and actual antenna elevation patterns for stations KNSD and KVEA-DT.

Robert D. Weller, P.E.

December 16, 1997

Affidavit

State of California
County of Sonoma | ss:

Robert D. Weller, being first duly sworn upon oath, deposes and says:

1. That he is a qualified Registered Professional Engineer, holds California Registration No. E-12627 which expires September 30, 1999, and is employed by the firm of Hammett & Edison, Inc., Consulting Engineers, with offices located near the city of San Francisco, California,

2. That he graduated from The University of California, Berkeley, in 1984, with a Bachelor of Science degree in Electrical Engineering and Computer Science, was an electronics engineer with the Federal Communications Commission from 1984 to 1993, with specialization in the areas of FM and television broadcast stations, cable television systems and satellite systems, and has been associated with the firm of Hammett & Edison, Inc., since June 1993,

3. That the firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of the licensee of TV Station KVEA, Channels N52/D39, Corona, California, to analyze the proposal of the Association of Local Television Stations, Inc. concerning the use of tilt-beam antennas to improve coverage of DTV stations without increasing interference to other stations,

4. That he has carried out such engineering work and that the results thereof are attached hereto and form a part of this affidavit, and

5. That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge except such statements made therein on information and belief and, as to such statements, he believes them to be true.

Robert D. Weller, P.E.

Subscribed and sworn to before me this 16th day of December, 1997

CRS 2 JERI L. THOMSEN COMM. #1028103 NOTARY PUBLIC-CALIFORNIA SAN MATEO COUNTY My Comm. Expires May 29, 1998 CRS 2

DTV.IXSTUDY™ Analysis Methodology

Implementation of FCC's Interference-Based Allocation Algorithm

On April 21, 1997, the Federal Communications Commission released its Sixth Report and Order to Mass Media Docket No. 87-268, establishing a final Table of Allotments for the transition from analog NTSC television service to a digital television ("DTV") service. The Commission utilized a complex set of computerized analysis tools to generate the DTV allotment table and added FCC Rules Section 73.623(b)(2), requiring that similar tools be employed to analyze individual DTV station assignments with regard to their potential interference to other DTV stations, DTV allotments, and existing or authorized NTSC facilities. Hammett & Edison has developed computer software to perform this function, based on an examination of the FCC software source code.

For any given NTSC or DTV station to be studied, the FCC analysis model first determines the location of the conventional F(50,50) Grade B contour of the NTSC station, or of the NTSC station associated with an assigned DTV station, using pattern information contained in the FCC engineering database and an assumed antenna elevation pattern. The model assumes that contour as an envelope, outside of which no protection from interference is implied or afforded. The location of the Grade B contour is also used to determine the assigned power for the DTV station, once again using conventional methods found in FCC Rules Section 73.699, Figures 9 and 10, but determining the power necessary on a radial basis to generate the associated DTV coverage contour (41 dBu for UHF, 36 dBu for high VHF Channels 7–13, and 28 dBu for low VHF Channels 2–6), for the assigned DTV channel. The maximum power determined using this method was assigned as the DTV operating power, provided it was calculated to be above established minimum power levels; otherwise, a minimum power level was assigned. Note that the use of this method usually creates a directional antenna pattern, even for DTV assignments to presently omnidirectional NTSC TV stations. The FCC requires that a DTV facility employ an antenna design that meets the calculated pattern, or that a nondirectional antenna be employed that does not exceed the directional pattern envelope in any direction, unless the creation of no new interference can be demonstrated.

In addition to the use of the Grade B envelope and an assumed directional transmitting antenna for all DTV facilities, the model assumes the use of directional receiving antennas at each studied location, or "cell." The characteristics of the receiving antennas are different not only for the low VHF, high VHF, and UHF frequency bands, but also for NTSC and DTV receiving situations, where, based on the FCC model, more directive antennas are employed for analysis of DTV reception.

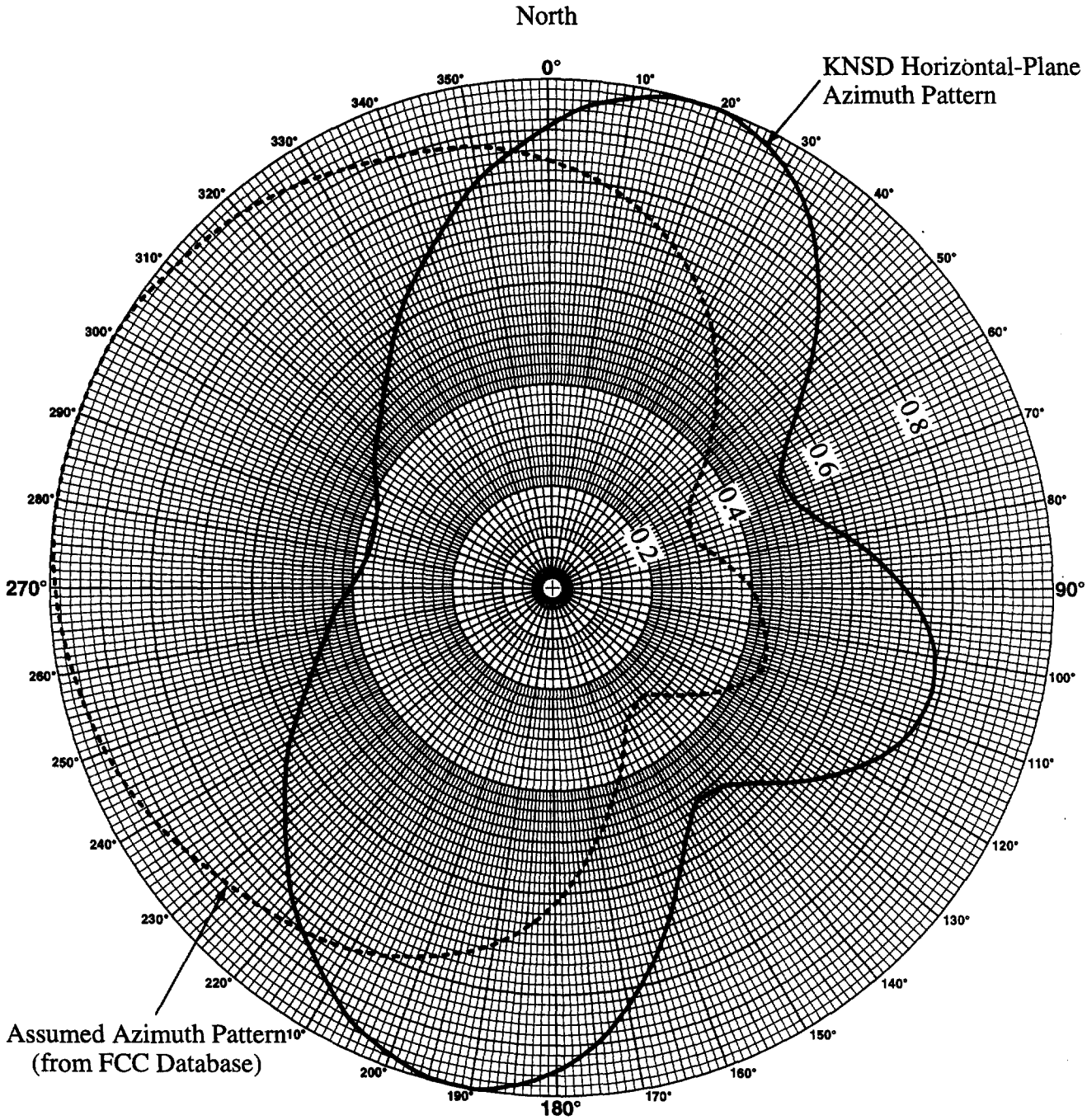
The FCC analysis technique employs terrain-sensitive calculation methods based on Version 1.2.2 of the ITS Irregular Terrain Model, also known as the Longley-Rice model. For each NTSC or DTV station to be studied, a grid of cells, two kilometers on a side, fills the associated Grade B contour. The program first determines which of the cells is predicted to receive service from the associated station, using Longley-Rice with F(50,50) statistical weighting for NTSC stations and F(50,90) statistical weighting for DTV stations. Cells determined to have no service are not studied for interference from other stations.* Once cells having service are determined, the software analyzes potential interference from other NTSC or DTV stations, again using the Longley-Rice propagation algorithm and F(50,10) statistical weighting for all potential interfering signals. Each cell is evaluated using the desired-to-undesired ratios presented in FCC Rules Section 73.623 for each channel relationship, and cells determined to have interference are flagged and summed with the study results of other cells, resulting in the generation of total interference area figures and tabulations of total population contained within the summed cells.

The Hammett & Edison analysis software program employs all of the analysis features described above, as well as several other more subtle elements employed in the FCC allotment program. Additionally, the Hammett & Edison program provides a graphical element that allows the identification of all interference cells on a map with an associated tabulation, and the program generates a DTV antenna pattern envelope that shows areas that can be maximized without creating interference in any cells that were not already receiving interference. The program can be used to test implementation scenarios that involve changes to antenna height, antenna pattern, channel number, and transmitter location. Additionally, the program has the capability to determine coverage areas of DTV and NTSC stations, with interference cells omitted. The Hammett & Edison program can also identify cells that fall in major bodies of water, based on digitized map data, summarizing those cells separately in an interference study or excluding them from a coverage study. Arguably, cells in water do not require protection from interference.

* It is noted that the Longley-Rice model is not always capable of determining, within certain confidence limits, whether a particular cell has service. In such cases, the Longley-Rice algorithm returns an error code; the FCC method for handling such error codes is to assume the associated cells have interference-free service, and as such, are not considered further. This assumption is presently being scrutinized by Hammett & Edison to determine its validity and to identify possible situations where significant actual interference areas may be overlooked from station studies.

TV Station KVEA • Channels N52/D39 • Corona, California

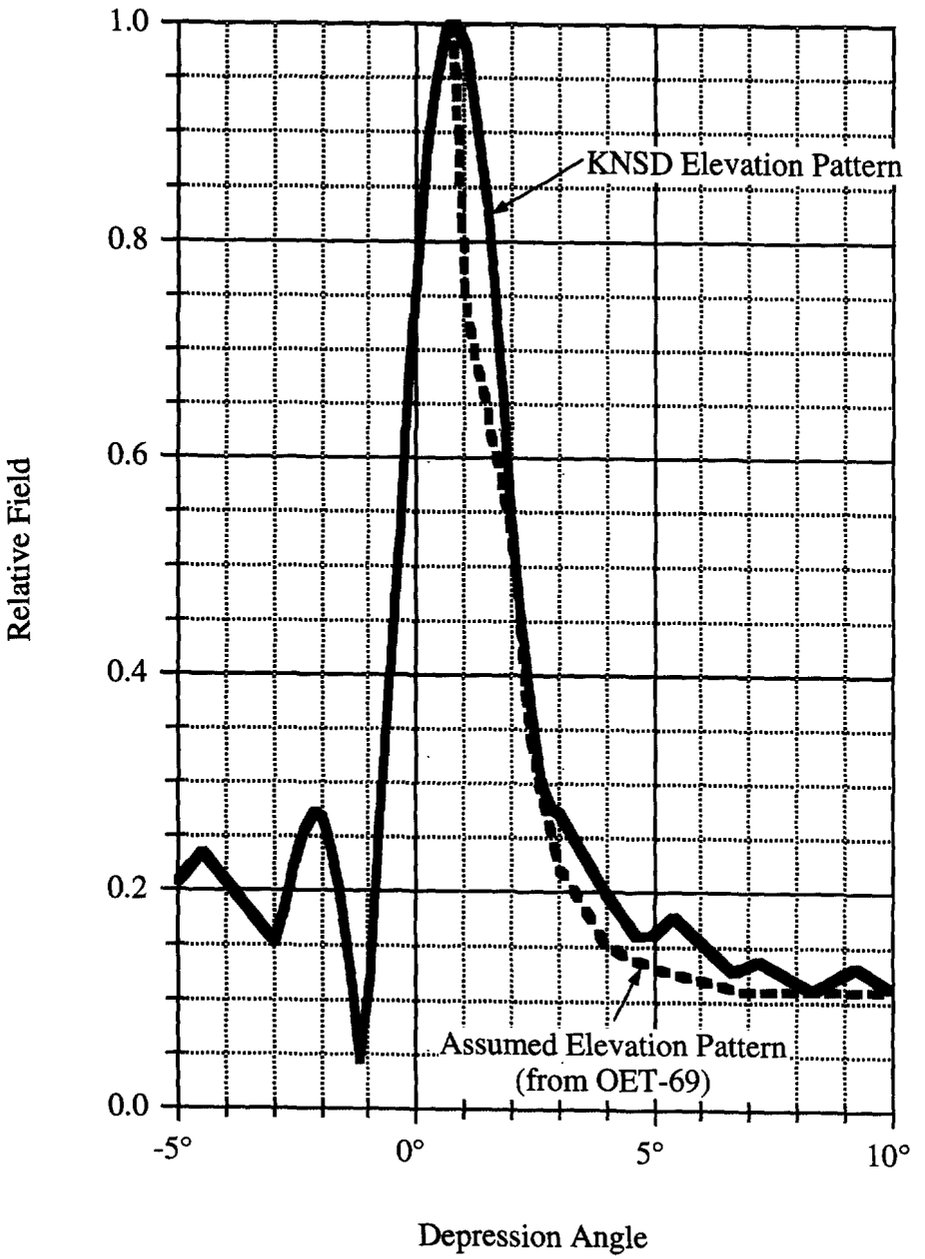
Comparison of Antenna Azimuth Pattern from FCC Engineering Database and Actual Pattern for TV Station KNSD



Note: Normalized relative field patterns.

TV Station KVEA • Channels N52/D39 • Corona, California

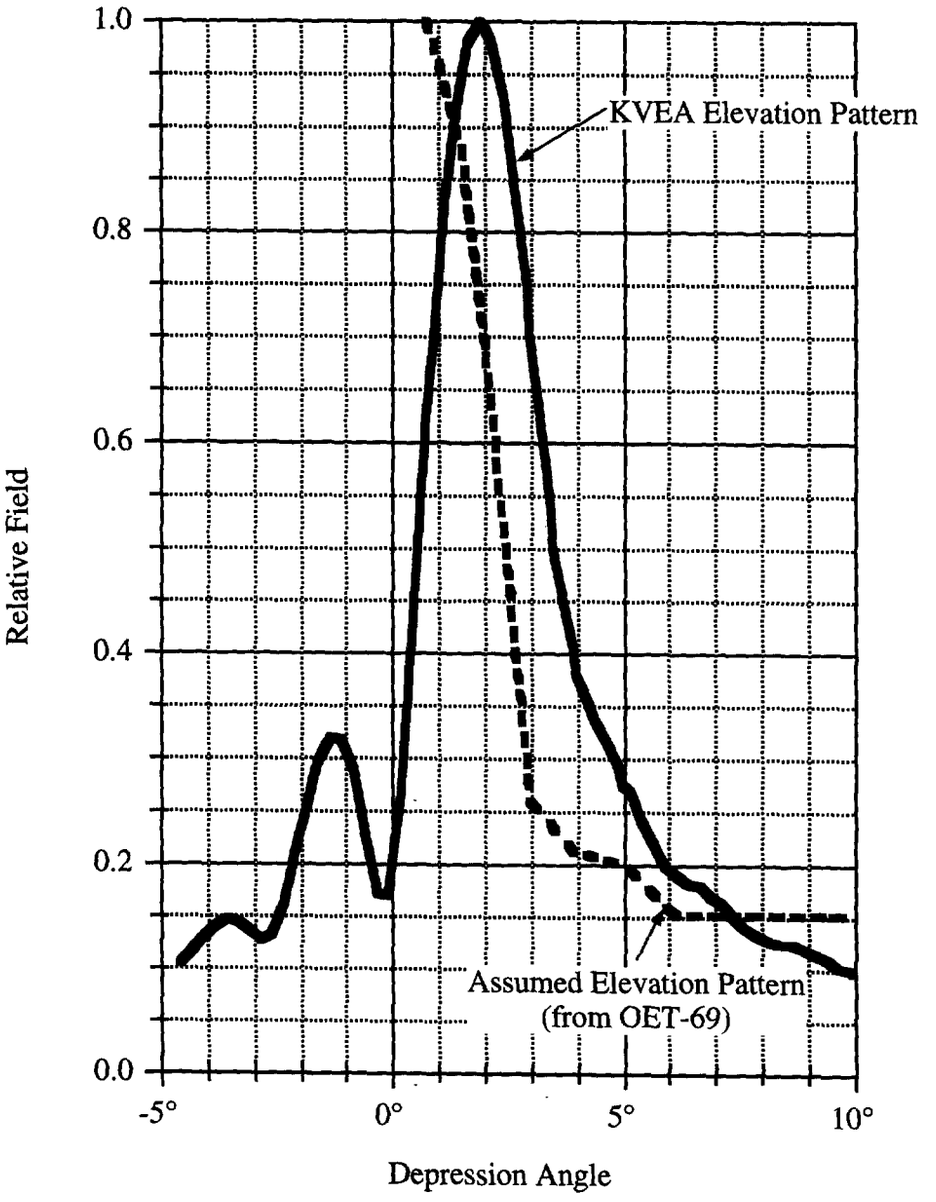
Comparison of FCC-Assumed and Actual* Antenna Elevation Patterns for TV Station KNSD



* KNSD elevation pattern shown without mechanical beam tilt.

TV Station KVEA • Channels N52/D39 • Corona, California

Comparison of FCC-Assumed and Probable* Antenna Elevation Patterns for Station KVEA-DT



* KVEA elevation pattern shown without mechanical beam tilt. The elevation pattern of the existing KVEA has been assumed for KVEA-DT.